



February 24, 2003

Dr. Richard Standiford
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 160 Mulford Hall
 Berkeley, CA 94720-3114

Dear Dr. Standiford,

On behalf of the interagency North Coast Watershed Assessment Program (NCWAP), I would like to thank you for your leadership in providing science peer review processes for several of our program's products. The Center for Forestry was instrumental in managing peer reviews of NCWAP's draft Methods Manual, Ecosystem Management Decision System (EMDS) watershed model, individual draft reports for the Gualala River, Mattole River and Redwood Creek watersheds, and most recently of the KRIS product for the Gualala River watershed.

The peer review comments were generally very constructive, and helped the program focus its scope, identify additional information and analysis needs, and improve assessment methods and tools. For your information, I've attached documentation of our actions, including: 1) detailed comments on NCWAP's draft Methods Manual; 2) a summary of EMDS model comments, subsequent revisions, and a proposal for additional refinements over time; and 3) a summary of NCWAP actions taken to address comments on individual reports that had cross-cutting significance for the program. These will also be available on our website (www.ncwatershed.ca.gov).

Comments and responses specific to individual draft assessment reports will be included in final reports for each of those watersheds. KRIS Gualala was also revised in response to peer review. The revised version includes detailed responses to peer review comments.

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As you probably know, NCWAP funding has been proposed for significant cuts in fiscal year 2003/2004. The program will, however, finalize the Draft Methods Manual during the remainder of this fiscal year, and our departments will use NCWAP products and work with landowners, agencies, restoration practitioners and others to demonstrate, evaluate, and adapt them. I hope we can continue to work with the University and Cooperative Extension in the future to improve these and other tools for watershed protection activities.

Sincerely,

A handwritten signature in cursive script, appearing to read "Cathy Bleier".

Cathy Bleier
Special Assistant for Salmon
and Watersheds

Attachments

Cc: Mary Nichols, Secretary for Resources Agency
Art Baggett, Chair, State Water Resources Control Board

Response of the North Coast Watershed Assessment Program (NCWAP) to Science Peer Review of the Draft NCWAP Methods Manual

The peer review team's comments incorporated a wide range of comments about the program's purpose, objectives, methods, and process for working with the public. It also included detailed suggestions for rewriting the manual. The following pages document our responses and those revisions we will make to the manual. Our responses are organized according to Dr. Standiford's summary of issues and suggestions in his letter of June 13, 2001.

Purpose, Scope and Completeness of Manual

Dr. Standiford summarized questions about the purpose of the draft manual. Drs. Kondolf and Ice said the document was more of a program description than a how-to manual for undertaking analyses. Both suggested testing the complete methodology and having additional peer review in a watershed before finalizing a methods manual.

The NCWAP manual was developed for Agency personnel rather than as a step-by-step guide for landowners, watershed groups or others; in this way they are different from the Oregon Watershed Assessment and Washington Watershed Analysis manuals. NCWAP was also intended to use existing methodologies wherever possible, so it concentrated on describing the program approach and products, provided additional detail on data collection methods in the appendices, and referenced other manuals.

As a result, we recognize that the methodology was consequently difficult to review and not specific enough in some places. Therefore NCWAP will revise the manual to:

- Finalize the Methods Manual after the first three watersheds (Redwood Creek, and Gualala and Mattole Rivers) have been completed, and consider Dr. Ice's suggestion for including some "concrete" examples of data collection and analyses from those assessments.
- Clarify data priorities and preferred methods based on those assessments;
- Exclude some sections, per Dr. Ice's suggestions, that are largely programmatic;
- Incorporate corrections about the Washington Watershed Analysis program offered by Matt O'Connor and George Ice to the extent that we continue to include that background material;
- Include the EMDS watershed model with modifications based on the peer review held in June, 2002.

CDF is working with the California Biodiversity Watershed Work Group to develop a more comprehensive methods manual for California citizens that addresses outstanding needs for step-by-step watershed assessment guidance. It will also clarify how landowners, watershed groups and others can expect to

combine or reconcile agency “top-down” assessments such as NCWAP or TMDLs with their own bottom-up assessment efforts. This will address Matt O’Connor’s concern that NCWAP should not necessarily be considered the “final word” when more detailed assessment information may be forthcoming by landowners.

The Need to Conduct Public Scoping

Dr. Standiford said reviewers generally felt we needed more detail on how NCWAP should scope out assessment needs for individual watersheds. Redwood Sciences Lab (RSL) emphasized working with the public and stakeholders to identify protection issues, watershed concerns, and sources of information in order to refine the critical questions for each basin and thus focus and shape the assessment process.

NCWAP agreed with these comments and developed the following process for working with stakeholders to improve the quality, relevance and use of assessment products. These steps will be included in the manual.

- Contact a wide range of community interests, starting with established multi-stakeholder groups where they exist, such as watershed councils, to sponsor scoping meetings. Where none exist, ask prominent stakeholder groups such as landowner organizations, recreational fishery groups, or local environmental groups to assist in hosting a public meeting, or host it ourselves, if necessary. Use local press and other means to announce these. If stakeholders don’t participate, try working with local individuals or smaller groups to identify their concerns and potential contributions. NCWAP was able to find local groups to host meetings in the first three watersheds.
- Explain program goals, methods and products, and identify local concerns. In the Redwood Creek basin, for example, initial scoping showed high local interest in estuary assessment and juvenile coho monitoring. In the Gualala, the local watershed council was concerned about agency requests for access disrupting local collaboration. As a result, the council and NCWAP team worked together to establish protocols for communication with landowners.
- Use existing assessment information and take advantage of cooperative assessment opportunities. Ask for data, reports, and other relevant information; interview local experts; and review historical or even anecdotal accounts where possible. Collaborate with local assessment and planning efforts in progress, if possible. In the Mattole River watershed, landowners and members of the Mattole Salmon Group and the Mattole Restoration Council met with NCWAP, provided data, and participated in several meetings and workshops. In the Gualala, the watershed council provided data, helped analyze data, and assisted NCWAP in contracting with local citizens for additional data collection.

- Communicate progress and products. Use email, websites, newsletters, meetings or workshops to communicate data collection plans, timelines, and results. Provide data contributors opportunity to review products.
- Where possible, assist local groups in addressing concerns beyond NCWAP's scope. Help the community identify or tap other experts, programs, and grants for technical support, if possible. In the Redwood Creek watershed, we helped link local efforts with other funding sources to monitor fish.

Critical Questions and the Assessment Approach

Dr. Standiford summarized reviewer concerns that the manual didn't explain how or whether critical questions would be answered. Some reviewers said the critical questions were good, but questioned the feasibility of answering them (Kondolf, Weber), while RSL said they were not comprehensive enough. RSL also emphasized the need to compare current watershed conditions with historic ones, and to look at down stream processes. RSL stressed the need for integration among disciplines, and suggested reorganizing the manual by critical questions rather than discipline.

The critical questions reflect drivers, interactions, and effects on a watershed's ability to support salmonids. They were intended to guide NCWAP's watershed model development, data collection, and analysis rather than create the expectation that NCWAP could address these all with a coarse assessment. Although information relevant to all original questions was incorporated into the assessments, much of it in the EMDS watershed model, it's true that NCWAP did not answer all parts of the original questions as posed, particularly those related to salmon health and populations, quantification of erosion, and effects of water use. Therefore, we have consolidated or modified the original questions along the following lines:

- What trends in salmonid population sizes and distribution are suggested by available historic information and recent data?
- What are the current habitat conditions for salmonids as reflected by parameters such as channel characteristics, water quality, riparian cover, refugia?
- What are the relationships among watershed processes, i.e. geologic, vegetation, and fluvial processes, and between those processes and disturbance regimes?
- How has land use affected these processes?
- Based upon habitat conditions and trends in watershed processes, what factors might be limiting salmonid production?
- What habitat improvement activities would likely lead to more desirable conditions in a timely, cost-effective manner?

The manual will be revised to include the modified assessment questions.

As described in the draft manual, NCWAP planned over time to incorporate a sediment delivery model (SEDMODL), large woody debris recruitment model (e.g. RAIS), and hydrologic model for stream flow in tributaries. Since these have not been completed, they will not be included in the manual. Fish population monitoring and comprehensive sediment budgets, on the other hand, were always considered to be beyond NCWAP's scope.

NCWAP agrees with RSL's concern that our assessment should compare current conditions with historic ones that supported salmon. Therefore, NCWAP assessments incorporated:

- Chronologies of land use, vegetation change, landslides and sedimentation, and fishery populations - to the extent information is available and resources permit multiple year analyses - at subbasin and basin scales;
- Working hypotheses about linkages among historic and current conditions, watershed processes, and land use as it has affected salmonid populations;
- Products and tools for cumulative and downstream effects analyses, including Relative Landslide Potential maps, EMDS watershed model outputs, and tables or maps associating land use, landslides, and sediment delivery.

These will be included in the revised manual.

Finally, we agree with RSL that most of the questions require *interdisciplinary* analysis to answer them. The overlap among sections was intentional. NCWAP's revised manual will explain the contribution of different disciplinary analyses to each question.

Comprehensiveness of Beneficial Use Assessment

Dr. Standiford discussed reviewer concerns that the program is not comprehensive enough to address all beneficial uses of water and watershed issues (RSL, Weber). RSL said that NCWAP's "key question" about which factors limit salmonids will not support TMDL development or cumulative effects analysis for Forest Practices Rule implementation, nor will it cover other wildlife species, including listed ones. He suggested that NCWAP consider how other questions might be addressed.

In general, the comments by RSL underscore the importance of clarifying the bounds of our program. The program was never intended to replace other assessment and planning processes, such as TMDL development, Water Quality Basin Planning, Recovery Planning for listed species, and THP analyses. NCWAP agencies chose to focus on watershed assessment for salmonids since

this is where responsibilities and interests intersect most prominently on the North Coast.

NCWAP disagrees, however, that its products will not contribute to TMDLs. Since most North Coast TMDLs are being driven by cold freshwater habitat beneficial uses, EPA and the North Coast Water Quality Control Board (NCWQCB) expressed interest in using NCWAP information on landslides, land use, roads, stream coverage, vegetation and refugia for TMDL development and implementation. The State Water Resources Control Board was also interested in and participated at our EMDS model workshop since they are developing one on sediment for TMDL development.

While other beneficial uses are related and interdependent with salmonid beneficial uses, the comprehensive assessment of all uses identified in Table 2 of RSL's comments is beyond NCWAP's scope and resources. However, water quality information from NCWQCB's Basin Plan activities and Surface Water Ambient Monitoring Program (SWAMP), which were coordinated with NCWAP, will be included in NCWAP.

It is beyond the scope and resources of NCWAP to develop a model that runs multiple risk analyses, quantitatively estimates sediment production, and then analyzes cumulative effects. The Board of Forestry and SWRCB are considering approaches such as the Dunne report proposal to model risk on a pilot watershed basis. Any such model will very likely require much of the baseline information being compiled and analyzed by NCWAP.

Potential for Using NCWAP for Adaptive Management

Dr. Kondolf suggested taking an adaptive management approach to assessment in order to incrementally reduce uncertainty about linkages. This would be accomplished by refining conceptual models, experimenting with management actions, and monitoring. It would likely require at least two years per basin.

NCWAP agreed to use "working hypotheses" to promote adaptive assessment. These focus on the linkages among watershed processes, land use, and conditions for salmonids, and highlight information – existing and new – that the assessment team deemed critical to supporting or refuting the hypothesis. This process clarifies areas of conflicting data or data gaps, and lends itself to alternative interpretations and testing by readers.

Experience in the first three watersheds has shown, however, that it requires two years just to work interactively with the public to implement the initial assessment. Additional "testing" of hypotheses or of the model for an individual basin is beyond the scope and resources of NCWAP. NCWAP did, as described in the manual, provide specific recommendations for management, restoration,

filling key data gaps and monitoring, which local stakeholders and others can implement. To the extent funding is available in the future, NCWAP will:

- Work with stakeholders or scientists who wish to test criteria or assumptions in the EMDS model in order to adapt and improve the model;
- Assist local groups, landowners, UCCE, RCDs and others seeking to pursue these types of follow-up activities.

Data Needs, Quality Control, and Statistical Validity

Dr. Standiford summarized statements that the assessment should ideally establish baseline data with sufficient statistical power to answer the critical questions and to serve as part of a longer term monitoring program. Concerns were expressed about using data from different sources and data collected for different purposes. RSL reviewers commented that habitat typing has been shown to be an inadequate basis for monitoring. RSL and Dr. Kondolf suggested that NCWAP avoid letting established data collection methods or tasks drive the assessment; comments seemed to focus on landslide mapping. Dr. Standiford said that NCWAP might need to obtain statistical advice on data collection design at some point.

NCWAP agrees with RSL that a one-year coarse assessment will not necessarily provide a data framework for making statistically valid comparisons of all watershed parameters. For one thing, many parameters, such as temperature, require multiple years of data collection to establish a baseline. For another, NCWAP data collection is limited to sites where access is permitted by private landowners. NCWAP made a good start by identifying existing data for the basin and evaluating its usefulness for watershed level assessment, collecting new data (contingent on access) to fill critical gaps or build on pre-existing monitoring efforts, identifying data gaps, and developing recommendations for monitoring.

With respect to concerns about suitable methods for monitoring and statistical analysis, the Water Board's SWAMP methodology was designed to detect changes in water quality over time at a watershed level. Habitat typing, on the other hand, has been criticized for lack of repeatability. Since the latter has been very useful as an inventory, diagnostic and educational tool and for identifying potential limiting factors, DFG maintains this method. However, in response to peer review concerns, DFG:

- Worked with EPA to develop a sampling scheme that is more statistically defensible at a watershed scale, and began using this in Redwood Creek and Big River;
- Is considering more repeatable stream measurements that could be incorporated into their inventories, such as those used for monitoring the Northwest Forest Plan; and
- Will incorporate monitoring recommendations (currently under development by DFG) for measuring restoration project effectiveness where appropriate.

We agree on the importance of data quality control, particularly for considering existing data from a broad array of stakeholders. The draft manual described QA/QC protocols for evaluating existing data and its relevance to NCWAP questions, assessment scale, and watershed model development. To document this process, the revised manual will include an example of the data catalogs with information about source, quality, scale, and use which are included in each NCWAP report .

With respect to “stand-alone” products driving the assessment, we disagree that NCWAP landslide maps are not linked to the rest of the assessment. They were used to produce the Relative Landslide Potential maps and the data are used in the EMDS potential sediment production module, both of which provide indicators of risk. They were also used to generate the interdisciplinary Integrated Analysis tables and to generate the Gualala map looking at landslides x roads x channel features x limiting factors.

Limiting Factors Analysis (LFA)

Dr. Standiford summarized concerns about how reference conditions will be determined for this purpose, the need to incorporate the natural range of variability of watershed conditions into a limiting factors analysis, and the need to consider what is realistically achievable in a given watershed in terms of those limiting factors. RSL was also concerned that a focus on limiting factors would ignore land use factors affecting instream conditions. In general, comments indicated that it was not defined enough to be fully reviewed.

NCWAP’s LFA relies heavily on the EMDS model. As used in NCWAP, “reference conditions” are those ranges of values whose distribution is used to rate a parameter’s suitability for salmonids in a given watershed. NCWAP developed reference condition curves using peer reviewed research, expert opinion, and data from reference watersheds (i.e. relatively undisturbed, naturally functioning watersheds) where available.

Unfortunately, few reference watersheds have been identified and studied in California’s North Coast region, and research on the effects of many upslope watershed parameters on North Coast salmonid habitat is also lacking. In those cases, NCWAP used empirical data from a watershed to construct an individualized reference condition curve, assuming it captured a range of suitable and unsuitable conditions. This occurred mostly in the potential sediment production module for road, land use, and slope stability parameters.

Peer reviewers for the EMDS review criticized this approach, however, on the grounds that we couldn’t assume those curves captured either “fully suitable” or “fully unsuitable” conditions. As a result of these discussions, NCWAP:

- Gave preference to values derived from reference watersheds and scientific literature;

- Used empirical data from non-reference watershed sites where reference watershed data was not available but redefined the condition curve to represent high and low potential suitability, rather than “fully suitable” or “fully unsuitable”.

With respect to concerns that LFA wouldn’t address land use and upslope factors, NCWAP used these factors to *prioritize* limiting factors for management and restoration purposes.

- DFG incorporates upslope and land use information during their stream surveys to develop restoration recommendations down to the tributary, if possible. These were then checked during interdisciplinary analysis, using new data on landslides and land use, and modified as needed for developing team-based recommendations.
- NCWAP teams used land use information, landslide and fluvial maps, and EMDS sediment module outputs to develop and prioritize watershed recommendations.
- The Gualala assessment integrated roads, instream sediment, landslide and LFA information on a map for guiding restoration planning.

While it was beyond NCWAP’s scope to model recovery or to determine whether conditions could return to pre-European conditions, these prioritizations allow landowners, watershed groups and others to focus efforts on factors that are presumably most “limiting” and to monitor progress and effects on those, rather than try to fix everything everywhere at once. It also addresses concerns about “achievability” by considering sequence of activities. For example, steps to stop sediment delivery to streams from upslope human activity would precede projects to restore pool habitat complexity, or identification of natural sediment sources might preclude any restoration efforts in some downstream reaches.

The Ecosystem Management Decision Support (EMDS) Watershed Model

Dr. Standiford summarized concerns about selection of appropriate model parameters, whether there will be adequate data, and opportunities for validation. Dr. Kondolf suggested vetting and testing the whole model with independent review. RSL said that it’s unlikely one model could be used for all North Coast watersheds.

EMDS was not fully developed when the draft manual was developed, and has undergone several rounds of development. Since EMDS is based on a branch of mathematics called linguistic modeling and relies on expert opinion, it does not lend itself to statistical validation. It can, however, be “validated” relative to expert opinion and field observations which may, in turn, indicate improvement needs related to selection of parameters and their relative weight in the model, calibration of reference curves, and representation of relationships among factors within logic networks, or that critical data are missing. Researchers, local stakeholders, or others who wish to test model assumptions or conduct

sensitivity analyses, could work with university and other researchers to explore these in order to improve the model for future use.

NCWAP will:

- Include the newest version in the final Methods Manual and in the reports, including explanations of model parameters, reference condition curves, and relationships among parameters.
- Summarize and be explicit about reasons for low confidence (e.g. lack of data, inadequate sampling design, or conflicting data) for parts of the model or basins;
- Explore ways to improve the model and its use through 1) monitoring efforts with landowners, local groups, agencies (e.g. UC Extension) and consultants; 2) basin or subregional conferences with state and federal agencies, UC, and research community to identify longer term monitoring or research needs related to the model.
- Incorporate peer review suggestions for the model as resources become available (see attached revision plan).

With respect to tailoring the model to individual watersheds, NCWAP will individualize EMDS with reference watershed data and expert opinion where available and appropriate (this included road information for the first three watersheds and sediment budget information in Redwood Creek).

Sediment Transport

Dr. Standiford summarized concerns that landslide mapping was not linked to critical questions about erosion and sedimentation, that surface erosion was not well addressed, and that more analysis or modeling was needed to address sediment transport. RSL suggested that sediment from sources other than large landslides may be significant to fish habitat, and asked how the assessment will assign causes to landslides. They also questioned how fluvial interpretation will be linked to limiting factor analysis.

Landslide mapping was linked to critical questions and limiting factor analysis in the first three watersheds by developing GIS-generated interdisciplinary tabular analyses of spatial relationships among landslides, fluvial mapping sediment data, and land use to consider relationships among processes and disturbance; and by mapping spatial relationships among watershed processes, limiting factors and land use in the Gualala (to consider land use effects on watershed processes and disturbance regimes and to identify activities that could address these). For the final manual, NCWAP will:

- Evaluate, select and include one or more of these;
- Describe how landslide maps are used to generate Relative Landslide Potential maps;

- Describe how landslide maps are used in conjunction with fluvial characteristics and fish habitat data to identify management and restoration opportunities;
- Include new EMDS model that shows how landslide data is used in EMDS to describe sediment production potential by planning watershed and subbasins, which in turn is used to answer questions about watershed processes, disturbance, and land use.

NCWAP will not measure surface sediment production nor provide comprehensive budgets for sediment transport since surface erosion and sediment yield are addressed in more detail through the TMDL program. NCWAP will use improved versions of SEDMODL as they become available to estimate surface erosion and sediment yields from roads.

Stream Gauge Needs

Dr. Standiford summarized concerns about the need for headwater stream gauges, and the need for evaluating flood frequency, flow duration, seasonal hydrograph patterns, and inter-annual variations.

Although it was beyond NCWAP's scope and resources to provide new detailed spatial stream flow data, some gages were installed in the upper portions of the basins, particularly at sites that had been discontinued.

Interdisciplinary Synthesis

Reviewers said more explicit direction is needed for how results from different departments would be synthesized. Several reviewers were concerned that the management team lacked authority to override departmental priorities.

NCWAP used an interdisciplinary process to answer several of the critical questions, to develop specific databases, maps, and other products, and to develop management and restoration recommendations. For the manual, NCWAP will:

- Explain the information used to answer questions related to salmonid habitat, relationships among watershed processes, land use, and habitat improvement activities (included data from all departments) ;
- Explain how hypotheses are used to lay out and evaluate different types and sources of information;
- Explain construction of tables examining spatial relationships among landslides, land use, and negative fluvial characteristics utilizing data from DOC and CDF, and Gualala map linking limiting factors, roads, and landslides to provide guidance for upslope restoration and management (data from DOC, DFG and CDF);
- Explain how EMDS is constructed and used;

- Explain how refugia integrate instream and information from potential sediment production module in EMDS;
- Explain how recommendations for restoration and management are developed and prioritized using limiting factors, landslide related data, and land use information.

The Resources Agency managed the interdepartmental NCWAP effort to ensure that departments were working toward common goals, to identify interdepartmental dependencies, and to facilitate products or activities as needed. The Agency worked with CalEPA, SWRCB and departments to review products and address potential disagreements. Field teams were managed by different departments, which in turn brought needs or disagreements to the management team.

The “authority” of the agencies resides in their policy commitments to using science-based, interdisciplinary information for watershed protection and, of course, their influence over the budgets of their departments. Based on the experiences in the first three watersheds, however, once department participants recognized the benefits of information sharing, the power of interdisciplinary analysis, and the effectiveness of the tools they were developing together, it was not necessary to “wield” this power. NCWAP will consider including management procedures in the manual, though this seems to conflict with other recommendations to reduce programmatic information.

NCWAP Responses to Cross-Cutting Peer Review Comments on Reports

<p>Improve interdisciplinary analysis</p> <ul style="list-style-type: none"> • Geology x land use x erosion/sediment x fish habitat 	<p>NCWAP response</p> <ul style="list-style-type: none"> • Developed EMDS, Integrated Analysis process, and Restoration Opportunities map (Gualala only) to examine linkages
<p>Improve analyses and discussions</p> <ul style="list-style-type: none"> • More discussion of historic vs current • Increase discussion of upland conditions • Use more modeling for filling gaps • Consider food availability for fish • Improve analysis of timber harvest • Determine likelihood of future change • Incorporate more statistically-based sampling • Address cumulative effects • Develop sediment budgets 	<p>NCWAP response</p> <ul style="list-style-type: none"> • Reports include land use, fish populations, channel conditions and other histories where available • Incorporated geology, land use, and EMDS into identification of refugia and mgmt and restoration recommendations • Examine Stillwater temperature model as resources become available • Beyond current resources but will incorporate into EMDS over time • New analyses conducted by decade and harvest methods • EMDS potential sediment risk module and channel trends analysis provide relevant information but complex modeling is beyond scope • DFG is testing new sampling design and methods developed with EPA • EMDS, integrated analysis tables, and interdisciplinary map for Gualala; complex risk-analyses are beyond program scope but NCWAP data will feed other pilot methods • Beyond scope of program

NCWAP Responses to Cross-Cutting Peer Review Comments

<p>Improve usefulness of recommendations</p> <ul style="list-style-type: none"> • Make them more specific spatially and by practice, linking them to findings and data • Suggest monitoring to fill data gaps and promote adaptive mgmt • Prioritize for cost-effectiveness 	<p>NCWAP response</p> <ul style="list-style-type: none"> • Recommendations now address limiting factor findings and consider land use, upslope condition, and channel conditions; they're provided down to tributary scales; they address different types of land use activities. Gualala restoration map is very spatially explicit. • Monitoring recommendations provided to fill data gaps and address areas of uncertainty in hypotheses. • Restoration is prioritized by Limiting Factors coupled with upslope condition and land use information
<p>Improve data and clarify uses</p> <ul style="list-style-type: none"> • Explain all data use by source and type • Use all road data 	<p>NCWAP response</p> <ul style="list-style-type: none"> • Data catalogues have been developed describing all data considered and developed. • Pilot project under way in Scott River watershed to uniformly improve road data
<p>Limiting factors</p> <ul style="list-style-type: none"> • Clarify your methods and address at basin scales 	<p>NCWAP response</p> <ul style="list-style-type: none"> • Methodology standardized. LFA conducted at multiple scales as data allow. Recommendations developed down to scales appropriate to data.

NCWAP Plans for Revising EMDS to Respond to Science Peer Review

Rich Walker, Russ Henly, Cathy Bleier

Summary of Major Points by Science Peer Review Panel

The panel stated that in general EMDS is a reasonable tool for evaluating fish habitat. The existing model reflects a good initial effort, however, substantial changes are needed. Reviewers recommended that NCWAP synthesis reports reduce their reliance on EMDS outputs until the model can be revised.

The panel or individual participants proposed the following:

- Break model into separate pieces based upon the following criteria:
 - Potential Condition ('native' (pre-1850) ability of watershed to support fish)
 - Current Condition (reflecting what the fish now directly encounter)
 - Relative Risks to fish (current threats to fish that may or may not be manifest)
 - Potential or Expected Future Condition (how close to (1) above can we now come, given history, projected ownership and management, etc.).
- Include passage barrier information as soon as possible.
- Include relevant landslide information from the California Geological Survey.
- Use process-oriented models where feasible within EMDS for phenomena such as sediment contribution of roads, water temperature, hydrologic stream flow, etc.
- Develop process-based models to capture temporal variability of stream processes and conditions.
- Incorporate ancillary information where available, such as sediment budgets from TMDLs, to weight the relative sediment contributions of roads vs. other activities.
- Create model of current food availability, as it is one of the main drivers for fish habitat.
- Make use of reference watersheds where available for EMDS curve breakpoints.
- Calibrate and validate model.
- NCWAP should refrain from using EMDS to combine all factors into a single measure of watershed suitability for salmon. EMDS is suitable as a general accounting tool, but not for this single measure result.
- Develop stream sampling protocols specifically for use in EMDS.

Proposed NCWAP Response: Phased Revisions

NCWAP will implement a number of revisions immediately. A number of changes require development of new models or the implementation of other scientists' models that have not yet been completed. Revisions related to these will be made in phases. The schedule is as follows:

- Phase I – Early fall 2002. This model will be used for Final Reports in the Gualala, Redwood and Mattole watersheds.
- Phase II - Spring, 2003. This version will be used for Albion and Big Watershed Assessments.
- Phase III - Summer/Fall 2003. These mostly entail incorporating emerging information or models; revisions are dependent on the completion of models by other scientists.
- Phase IV: 2004. This will entail developing new models or approaches, and may be dependent on the availability of resources and academic scientists or consultants.

Schedule of Revisions

Phase I (completed):

- 1) Restructure model to represent relative risk (i.e. from Sediment Production) and current conditions (Stream Reach, Fish Habitat, Water Quality, and Fish Food).
- 2) Assess fish passage barrier data, where available, outside of the EMDS model for time being.
- 3) Include all available CGS data in the Sediment Production model, including Landslide Potential GIS layer, landslides point data, and gullies.
- 4) Evaluate sediment budget information from TMDLs and other sources and incorporate into Sediment Production model for weighting purposes as appropriate.

Phase II

- 5) Include modeling for stream temperature (e.g. BasinTemp by Stillwater Assoc.).
- 6) Develop sampling designs for stream reach data so that it can also be used at watershed scale (tested in part of Redwood Creek and Big River watersheds).

Phase III:

- 7) NCWAP will examine Monitoring Study Group's reference watersheds for adjusting breakpoints, and will explore emerging fisheries studies, reports and plans to examine additional information relevant to improving breakpoint estimates. The completion of this effort is contingent on the availability of information.
- 8) NCWAP will identify calibration needs and consider following validation options:
 - Use of TMDLs and other sediment budget data
 - Validating input parameters with stratified random field checks for accuracy and representativeness
 - Calibrating breakpoints using half of the reference watersheds, and validating model by testing its ability to correctly categorize conditions of the remaining half.
- 9) Refine assessment of sediment production risk for roads by incorporating SEDMODL_V2 to model coarse and fine sediment from road.
- 10) Include models on LWD recruitment.

- 11) Develop or work with USGS to demonstrate improved stream flow models. If resources are limiting or other models or still in development, implementation may be delayed until Phase IV.

Phase IV:

- 12) Develop model for fish food availability.
- 13) Apply information generated through pilot study of Dunne report recommendations. This study will begin during Phase I and last several years.